

CLAIMS

1. A signal processor comprising:
- 2 a signal combiner having a first input, a second input, and an output,
wherein the signal combiner is characterized by a combiner transfer function;
- 4 a noise estimator having an input coupled to the output of the signal
combiner to generate a noise estimate of a signal output from the signal
6 combiner;
- 8 a noise gain discriminator, characterized by a discriminator transfer
function, coupled to the noise estimator to generate a gain correction factor;
and
- 10 an error signal accumulator having an input coupled to the noise gain
discriminator and an output coupled to the second input of the signal
12 combiner;
- 14 wherein the signal processor maintains the output of the signal combiner
at a predetermined noise gain set point.
2. The signal processor of Claim 1 further comprising a filter
2 interposed between the noise gain discriminator and error signal accumulator.
3. The signal processor of Claim 2 wherein the filter is a lowpass
2 filter.
4. The signal processor of Claim 1 further comprising a receiver,
2 wherein the first input of the signal combiner is coupled to an output
subsequent to a receiver Automatic Gain Control (AGC) stage.
5. The signal processor of Claim 1 wherein the receiver is a wireless
2 communication receiver.
6. The signal processor of Claim 5 wherein the wireless
2 communication receiver is adapted to receive Code Division Multiple Access
(CDMA) signals.
7. The signal processor of Claim 1 further comprising a baseband
2 signal processor coupled to the output of the signal combiner, wherein the

baseband signal processor is adapted to demodulate the signal output from the
 4 signal combiner.

8. The signal processor of Claim 1 wherein the first input of the
 2 signal combiner is adapted to input multiple signals, the output of the signal
 combiner is adapted to output multiple signals, and the input of the noise
 4 estimator is adapted to input multiple signals.

9. The signal processor of Claim 8 wherein the multiple signals are I
 2 and Q components of a quadrature signal.

10. The signal processor of Claim 1 wherein the noise estimator
 2 comprises:
 4 a Walsh Code Discover stage adapted to despread and Walsh discover a
 noise estimator input signal;
 an accumulator coupled to the Walsh Code Discover stage adapted to
 6 accumulate a predetermined number of outputs from the Walsh Code Discover
 stage;
 8 an energy computation coupled to the accumulator adapted to calculate
 an energy estimate of the accumulator output; and
 10 an energy accumulator adapted to accumulate a predetermined number
 of energy estimates.

11. The signal processor of Claim 10 wherein the Walsh Code
 2 Discover stage despreads and Walsh discovers the input signal using a Walsh
 code not assigned to a channel within a communication system.

12. The signal processor of Claim 11 wherein the Walsh code used to
 2 despread and discover the input signal has a length equal to a Walsh code
 length used within the communication system.

13. The signal processor of Claim 12 wherein the Walsh code length is
 2 sixteen.

14. The signal processor of Claim 13 wherein the Walsh code is
 2 "++++-----", where binary signals are represented with "+" or "-" values and
 "+" represents a "0" and "-" represents a "1".

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15. The signal processor of Claim 11 wherein the predetermined
2 number of outputs from the Walsh Code Discover stage accumulated by the
accumulator is equal to the Walsh code length used in the Walsh Code Discover
4 stage.

16. The signal processor of Claim 11 wherein the Walsh code used to
2 despread and discover the input signal has an equal number of ones and zeros.

17. The signal processor of Claim 16 wherein the Walsh code used to
2 despread and discover the input signal has a length of four.

18. The signal processor of Claim 17 wherein the Walsh code used to
2 despread and discover the input signal is "++--", where binary signals are
represented with "+" or "-" values and "+" represents a zero and "-" represents a
4 one.

19. The signal processor of Claim 10 wherein the noise estimator
2 input signal is a quadrature signal having an I signal component and a Q signal
component.

20. The signal processor of Claim 19 wherein the Walsh Code
2 Discover stage has an I input, a Q input, an I output, and a Q output.

21. The signal processor of Claim 20 wherein the accumulator
2 independently accumulates I and Q signal outputs from the Walsh Code
Discover stage to produce an accumulated I output signal and an accumulated
4 Q output signal.

22. The signal processor of Claim 21 wherein the energy estimate is
2 the sum of the squares of the accumulated I output signal and the accumulated
Q output signal.

23. The signal processor of Claim 1 wherein the gain correction factor
2 generated by the noise gain discriminator is the difference between an input to
the noise gain discriminator and the predetermined noise gain set point.

24. The signal processor of Claim 1 wherein the gain correction factor
2 generated by the noise gain discriminator is the ratio of the predetermined
noise gain set point to an input signal to the noise gain discriminator.

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25. A signal processor comprising:
- 2 a noise gain controller adapted to scale an input signal such that a
constant noise energy level is maintained at the output signal; and
- 4 a baseband processor coupled to the output of the noise gain controller
adapted to demodulate the output signal.
- 6

26. The signal processor of Claim 25 wherein the noise gain controller
- 2 comprises:
- a signal combiner adapted to scale the input signal by a gain correction
- 4 factor to produce the output signal;
- a noise estimator adapted to calculate a noise estimate of the output
- 6 signal; and
- a noise gain estimator adapted to generate the gain correction factor
- 8 based on the noise estimate and a predetermined noise gain set point.

27. A method of signal processing comprising:
- 2 receiving communication signals;
- processing the communication signals to produce an output signal
- 4 having a constant noise energy; and
- demodulating the output signals.

28. The method of Claim 27 wherein processing the communication
- 2 signals comprises:
- estimating a noise energy in the communication signals;
- 4 calculating a gain correction factor using the noise energy estimate and a
predetermined noise gain set point; and
- 6 scaling the communication signals by the gain correction factor.

29. The method of Claim 28 wherein estimating the noise energy
- 2 comprises:
- despreading the input signals to produce noise samples;
- 4 accumulating a predetermined number of noise samples;
- computing an energy estimate of the noise samples; and
- 6 accumulating a predetermined number of energy estimates.

30. The method of Claim 28 wherein the input signals are despread
- 2 using a Walsh code.

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31. The method of Claim 30 wherein the Walsh code is a Walsh code
2 not assigned to any communication channel within a communication system
generating the input signals.

32. The method of Claim 31 wherein the Walsh code not assigned to
2 any communication channel is of the same length as an assigned Walsh channel
within the communication system.

33. The method of Claim 32 wherein the assigned Walsh code length
2 is sixteen.

34. The method of Claim 31 wherein the Walsh code not assigned to
2 any communication channel is "++++-----++++", where binary signals are
represented with "+" or "-" values and "+" represents a "0" and "-" represents a
4 "1".

35. The method of Claim 28 wherein the input signals are despread
2 using a predetermined code having an equal number of ones and zeeros.

36. The method of Claim 35 wherein the predetermined code is "++--",
2 where binary signals are represented with "+" or "-" values and "+" represents a
zero and "-" represents a one.